

Serial Number: To be assigned

REMARKS

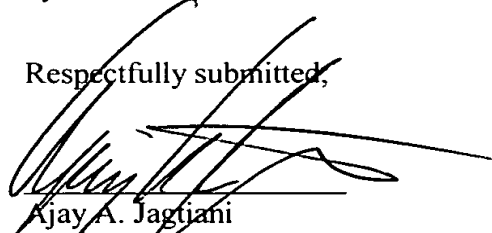
Favorable reconsideration of this application as presently amended is respectfully requested.

The Specification has been amended to clarify the oxidation step as provided in U.S. Patent 6,014,395 and other patents that this application claims as priority. No new matter has been entered by the amendment to the Specification.

The claims have been amended to be identical to U.S. Patent 5,903,588. An Interference is requested in the enclosed Notice of Interference. Basis for adding these claims may be found in the attached table.

In view of the foregoing, it is respectfully submitted that this application is now in condition for allowance, and favorable action is respectfully solicited.

Respectfully submitted,


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| Present Application PICO-0029-1 | Basis in Specification |
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| Claim 57 | |
| A laser structure, comprising: an active region; | Column 7, lines 16, 24, 32,33, 48, and 57. See Figs. 5A-F (86). |
| a first electrical contact disposed on a first surface of said laser structure; | Column 7, lines 21, 29-30, 36, 44, 53, and 60. See Figs. 5A-F (96). |
| a second electrical contact, said active region being disposed between said first and second electrical contacts; | Column 7, lines 22, 30 and 36. See Figs. 5A-C (98). Column 7, lines 45, 53 and 60. See Figs. 5D-F (128). Figs. 5A-C illustrate active region 86 being disposed between top contact 96 and bottom contact 98. Figs. D-F illustrate active region 86 being disposed between top contact 96 and bottom contact 128. |
| a first current blocking layer, said first current blocking layer being subject to physical change when exposed to a preselected agent; | Column 6, lines 13-14, referring to Fig. 2B (illustrating oxidizing layer 12). See also Column 7, lines 28-34. See Figs. 5A-F (teaching oxidized portions 28). |
| first means for selectively exposing a portion of said first current blocking layer to said preselected agent to define a first unchanged region of said first current blocking layer surrounded by a first changed region of said first current blocking layer, said first unchanged region of said first current blocking layer being aligned with a preselected region of said active region, said first changed region being electrically insulative, said first unchanged region being electrically conductive; | Column 8, lines 54-48, referring to Fig. 6E (illustrating an ohmic etch/deposition step in which holes 168 are etched through regions defined by masks 170. As discussed in column 6, lines 14-19, etching is also involved to form a plurality of pits, 58 and 58', or more; may be formed which may be nominally identical or of different depths as illustrated by pit 58' in Fig. 2B. Fig. 6F illustrates not only the first means for selectively exposing a portion of said first and second current blocking layers (oxidized layers 28 of Figs. 5A-F and 24 of Fig. 6F) to a preselected agent to define a first unchanged region (nonoxidized layers 26 of Figs. 5A-F and 26 of Fig. 6F) of the plurality of current blocking layers, but also the second means by incorporating the etching of the plurality of pits 58 and 58', or more, as discussed above. Fig. 6F illustrates that a second etch is performed masked by photoresist 172, forming larger holes 174 which reaches through oxidizing layers 24 and nonoxidizing layers 26. Additionally, as discussed in column 9, lines 4-9, Fig. 6G illustrates the result of the oxidation step forming oxidized layers 175 and oxidized mirror layers 176, showing a |

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| | <p>plurality of unchanged regions of the plurality of current blocking layers 175 and the plurality of oxidized mirror layers 176. As to the conductive/insulative regions, see column 5, lines 29-31, referring to Fig. 1B (interdiffused portion 32 of oxidizing layer 24 is substantially electrically conductive, while oxidized portion 28 is electrically resistive). See also column 6, lines 23-28, referring to Fig. 3 (oxidation barriers 18 and 18'); column 10, lines 59-63, with reference to Fig. 9.</p> |
| <p>wherein said first means for selectively exposing includes at least one etched depression extending from said first surface of said laser structure into the body of said laser structure and through said first current blocking layer to expose a portion of said current blocking layer to said preselected agent during manufacture of said laser structure.</p> | <p>Column 6, lines 5-22. See Fig. 2 (describing that pit 58 is typically formed by etching, where 58 typically extends at least into, or very near to, oxidizing layer 12). Oxidizing layer 12, according to Column 5, lines 52-55, and Fig 1D, is made up of a plurality of oxidizing layers. See also Column 6, line 14, referring to Fig. 2B (pit 58 is typically formed by etching). Further, column 6, lines 15-18, and Fig. 2B, teach that a plurality of pits 58 and 58', or more, may be formed which may be nominally identical or of different shapes and/or depths as illustrated by pit 58'. See also column 8, lines 54-58, Fig 6E (holes 168 are etched through masks 170); Column 8, line 66-67, Fig. 6F, for holes 174.</p> |
| Claim 58 | |
| <p>The laser structure of claim 57, wherein: said laser structure is a vertical cavity surface emitting laser.</p> | <p>Column 6, lines 43. See Figs. 5A (80), 5B (102), 5C (110), 5D (116), 5E (130) and 5F (138). Fig. 6 illustrates an example of a processing method to produce VSCELs. See also Column 9, line 123; Fig. 7 (180).</p> |
| Claim 59 | |
| <p>The laser structure of claim 57, further comprising: a second current blocking layer, said second current blocking layer being subject to change when exposed to said preselected agent;</p> | <p>Column 9, lines 4-9. See Fig. 6G (175). See also column 5, lines 52-55, Fig. 1D (a plurality of oxidizing layers 12). Figs. 5A-F illustrate a plurality of current blocking layers 28, each being oxidized portions of the current blocking layer being subject to oxidation when exposed to an oxidizing agent.</p> |

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| <p>means for selectively exposing a portion of said second current blocking layer to said preselected agent to define a second unchanged region of said second current blocking layer surrounded by a second changed region of said second current blocking layer, said second unchanged region of said second current blocking layer being aligned with said preselected region of said active region, said second changed region being electrically insulative, said second unchanged region being electrically conductive, said first and second unchanged regions being aligned with each other to define a current channel extending through said preselected region of said active region; and</p> | <p>Column 8, lines 54-48, referring to Fig. 6E (illustrating an ohmic etch/deposition step in which holes 168 are etched through regions defined by masks 170. As discussed in column 6, lines 14-19, etching is also involved to form a plurality of pits, 58 and 58', or more, may be formed which may be nominally identical or of different depths as illustrated by pit 58' in Fig. 2B. Fig. 6F illustrates not only the first means for selectively exposing a portion of said first and second current blocking layers (oxidized layers 28 of Figs. 5A-F and 24 of Fig. 6F) to a preselected agent to define a first unchanged region (nonoxidized layers 26 of Figs. 5A-F and 26 of Fig. 6F) of the plurality of current blocking layers, but also the second means by incorporating the etching of the plurality of pits 58 and 58', or more, as discussed above. Fig. 6F illustrates that a second etch is performed masked by photoresist 172, forming larger holes 174 which reaches through oxidizing layers 24 and nonoxidizing layers 26. Additionally, as discussed in column 9, lines 4-9, Fig. 6G illustrates the result of the oxidation step forming oxidized layers 175 and oxidized mirror layers 176, showing a plurality of unchanged regions of the plurality of current blocking layers 175 and the plurality of oxidized mirror layers 176. As to the conductive/insulative regions, see column 5, lines 29-31, referring to Fig. 1B (interdiffused portion 32 of oxidizing layer 24 is substantially electrically conductive, while oxidized portion 28 is electrically resistive). See also column 6, lines 23-28, referring to Fig. 3 (oxidation barriers 18 and 18'); column 10, lines 59-63, with reference to Fig. 9.</p> |
| <p>said means for selectively exposing a portion of said second current blocking layer further comprises at least one etched depression extending from said first surface of said laser into the body of said laser structure and</p> | <p>Column 6, lines 5-22. See Fig. 2 (describing that pit 58 is typically formed by etching, where 58 typically extends at least into, or very near to, oxidizing layer 12). Oxidizing layer 12,</p> |

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| <p>through said second current blocking layer to expose a portion of said second current blocking layer to said preselected agent during manufacture of said laser structure.</p> | <p>according to Column 5, lines 52-55, and Fig 1D, is made up of a plurality of oxidizing layers. See also Column 6, line 14, referring to Fig. 2B (pit 58 is typically formed by etching). Further, column 6, lines 15-18, and Fig. 2B, teach that a plurality of pits 58 and 58', or more, may be formed which may be nominally identical or of different shapes and/or depths as illustrated by pit 58'. See also column 8, lines 54-58, Fig 6E (holes 168 are etched through masks 170); Column 8, line 66-67, Fig. 6F.</p> |
| <p>Claim 60</p> <p>The laser structure of claim 57, wherein: said laser structure comprises a substrate portion, a lasing portion disposed on said substrate portion, a contact support portion disposed on said substrate portion, and a bridging portion disposed on said substrate portion, said bridging portion connected between said lasing portion and said contact support portion, said first current blocking layer being exposed at a surface of said lasing portion.</p> | <p>Substrate portion: Column 7, lines 15, 23, 31, <i>inter alia</i>, referring to Figs. 5A-F (illustrating substrate 82). See also Fig. 7 (substrate 182). Referring to Figs. A-F, lasing portion 86 is disposed on substrate portion 82. See also Column 9, line 21. See Fig. 6J displaying interconnect metal 100, where oxidation barrier (first current blocking layer 28) is exposed at the surface of the lasing portion 86. Interconnect metal 100 is comprised of the contact support portion 96 and the bridging portion 100 disposed on the substrate portion. And see column 5, lines 52-55, referring to Fig. 1D (illustrating conductive element 40 comprising a plurality of oxidizing layers 12, teaching that a plurality of layers are exposed at the surface of the lasing portion).</p> |
| <p>Claim 61</p> <p>The laser structure of claim 59, wherein: said laser structure comprises a substrate portion, a lasing portion disposed on said substrate portion, a contact support portion disposed on said substrate portion, and a bridging portion disposed on said substrate portion, said bridging portion connected between said lasing portion and said contact support portion, said first and second current blocking layers being exposed at a surface of said lasing portion.</p> | <p>Substrate portion: Column 7, lines 15, 23, 31, <i>inter alia</i>, referring to Figs. 5A-F (illustrating substrate 82). See also Fig. 7 (substrate 182). Referring to Figs. A-F, lasing portion 86 is disposed on substrate portion 82. See also Column 9, line 21. See Fig. 6J displaying interconnect metal 100, where oxidation barrier (first current blocking layer 28) is exposed at the surface of the lasing portion 86. Interconnect metal 100 is comprised of the contact support portion 96 and the bridging portion 100 disposed on the</p> |

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| | substrate portion. And see column 5, lines 52-55, referring to Fig. 1D (illustrating conductive element 40 comprising a plurality of oxidizing layers 12, teaching that a plurality of layers are exposed at the surface of the lasing portion). |
| Claim 62 | |
| The laser structure of claim 57, wherein: said preselected agent is an oxidizing agent and said physical change is oxidation. | Column 4, lines 60-66, column 5, lines 1-6, <i>inter alia</i> . |
| Claim 63 | |
| The laser structure of claim 62, wherein: said oxidizing agent is water vapor. | Column 9, line 8 (oxidation performed, for example, at 425°C in a water vapor rich atmosphere). |
| Claim 64 | |
| The laser structure of claim 57, wherein: said preselected agent is an etchant. | Column 6, line 14. See Fig. 2B (pit 58 is typically formed by etching); column 8, lines 54-58, Fig 6E (holes 168 are etched through masks 170); Column 8, line 66-67, Fig. 6F. |
| Claim 65 | |
| The laser structure of claim 64, wherein: said etchant is an acid. | Known in the art. |
| Claim 66 | |
| The laser structure of claim 57, wherein said first means for selectively exposing further comprises: four etched depressions extending from said first surface of said laser structure into the body of said laser structure and through said first current blocking layer to expose a plurality of portions of said current blocking layer to said preselected agent during manufacture of said laser structure. | Column 6, lines 5-22. See Fig. 2 (describing that pit 58 is typically formed by etching, where 58 typically extends at least into, or very near to, oxidizing layer 12). Oxidizing layer 12, according to Column 5, lines 52-55, and Fig 1D, is made up of a plurality of oxidizing layers. See also Column 6, line 14, referring to Fig. 2B (pit 58 is typically formed by etching). Further, column 6, lines 15-18, and Fig. 2B, teach that a plurality of pits 58 and 58', or more, may be formed which may be nominally identical or of different shapes and/or depths as illustrated by pit 58'. See also column 8, lines 54-58, Fig 6E (holes 168 are etched through masks 170); Column 8, line 66-67, Fig. 6F, for holes 174. |
| Claim 67 | |
| The laser structure of claim 57, further comprising: an first mirror structure comprising a first plurality of layers; | Column 7, line 19. See Fig. 5A (oxidized top mirror 88 comprising oxidized layers 89 and semiconductor layers 80). See also Column 7, lines 27-29, Fig. 5B (dielectric top mirror 106 |

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| | comprising low-index dielectric layers 107 and high-index dielectric layers 108); and see Fig. 5C (illustrating top mirror 112); Fig. 5D (illustrating oxidized top mirror 122 comprising oxidizing layers 123 and semiconductor layers 124); Fig. 5E (illustrating dielectric top mirror 134 comprising low-index dielectric layers 135 and high-index dielectric layers 136). |
| a second mirror structure comprising a second plurality of layers, said active region being disposed between said first and second mirror structures. | Column 7, line 16. See Fig. 5A (semiconductor bottom mirror 84, where active region is disposed between 1st and 2nd mirror structures). See also Column 7, line 24, Fig. 5B (illustrating active region being disposed between top mirror 106 and semiconductor bottom mirror 84); column 7, lines 32-35, referring to Fig. 5C (illustrating active region 86 being disposed between semiconductor bottom mirror 84 and semiconductor top mirror 112); and column 7, lines 34-43, referring to Fig. 5D (illustrating active region 86 being disposed between oxidized bottom mirror 118 comprising alternating oxidized layers 119 and semiconductor layers 120 and oxidized top mirror 122 comprising oxidized layers 123 and semiconductor layers 124). |
| Claim 68 | |
| The laser structure of claim 59, wherein: said means for selectively exposing a portion of said second current blocking layer further comprises four etched depressions extending from said first surface of said laser structure into the body of said laser structure and through said second current blocking layer to expose a plurality of portions of said second current blocking layer to said preselected agent during manufacture of said laser structure. | Column 6, lines 5-22. See Fig. 2 (describing that pit 58 is typically formed by etching, where 58 typically extends at least into, or very near to, oxidizing layer 12). Oxidizing layer 12, according to Column 5, lines 52-55, and Fig 1D, is made up of a plurality of oxidizing layers. See also Column 6, line 14, referring to Fig. 2B (pit 58 is typically formed by etching). Further, column 6, lines 15-18, and Fig. 2B, teach that a plurality of pits 58 and 58', or more, may be formed which may be nominally identical or of different shapes and/or depths as illustrated by pit 58'. See also column 8, lines 54-58, Fig 6E (holes 168 are etched through masks 170); Column 8, line 66-67, Fig. 6F, for |

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| | holes 174. |
| Claim 69 | |
| A laser structure, comprising: an active region; | Column 7, lines 16, 24, 32,33, 48, and 57. See Figs. 5A-F (86). |
| a first electrical contact disposed on a first surface of said laser structure; | Column 7, lines 21, 29-30, 36, 44, 53, and 60. See Figs. 5A-F (96). |
| a second electrical contact, said active region being disposed between said first and second electrical contacts, said laser structure being a vertical cavity surface emitting laser; | Column 7, lines 22 and 30. See Figs. 5A-C, which illustrate active region 86 being disposed between top contact 96 and bottom contact 98. See also Column 7, lines 45, 53 and 60. See Figs. 5D-F (128). Figs. D-F illustrate active region 86 being disposed between top contact 96 and bottom contact 128. As to being a VSCSEL, see Column 6, lines 43. See Figs. 5A (80), 5B (102), 5C (110), 5D (116), 5E (130) and 5F (138). Fig. 6 illustrates an example of a processing method to produce VSCELs. See also Column 9, line 123; Fig. 7 (180). |
| a first current blocking layer, said first current blocking layer being subject to oxidation when exposed to an oxidizing agent; | Column 6, lines 13-14, referring to Fig. 2B (illustrating oxidizing layer 12). See also Column 7, lines 28-34. See Figs. 5A-F (teaching oxidized portions 28). |
| a second current blocking layer, said second current blocking layer being subject to oxidation when exposed to said oxidizing agent; | Column 9, lines 4-9. See Fig. 6G (175). See also column 5, lines 52-55, Fig. 1D (a plurality of oxidizing layers 12). Figs. 5A-F illustrate a plurality of current blocking layers 28, each being oxidized portions of the current blocking layer being subject to oxidation when exposed to an oxidizing agent. |
| a first means for selectively exposing a portion of said first current blocking layer to said oxidizing agent to define a first nonoxidized region of said first current blocking layer surrounded by a first oxidized region of said first current blocking layer, said first nonoxidized region of said first current blocking layer being aligned with a preselected region of said active region, said first oxidized region being electrically insulative, said first nonoxidized region being electrically conductive; | Column 8, lines 54-48, referring to Fig. 6E (illustrating an ohmic etch/deposition step in which holes 168 are etched through regions defined by masks 170. As discussed in column 6, lines 14-19, etching is also involved to form a plurality of pits, 58 and 58', or more, may be formed which may be nominally identical or of different depths as illustrated by pit 58' in Fig. 2B. Fig. 6F illustrates not only the first means for selectively exposing a portion of said first and second current blocking layers (oxidized layers 28 of Figs. 5A-F and 24 of Fig. 6F) to a preselected agent to define a first unchanged region |

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| | <p>(nonoxidized layers 26 of Figs. 5A-F and 26 of Fig. 6F) of the plurality of current blocking layers, but also the second means by incorporating the etching of the plurality of pits 58 and 58', or more, as discussed above. Fig. 6F illustrates that a second etch is performed masked by photoresist 172, forming larger holes 174 which reaches through oxidizing layers 24 and nonoxidizing layers 26. Additionally, as discussed in column 9, lines 4-9, Fig. 6G illustrates the result of the oxidation step forming oxidized layers 175 and oxidized mirror layers 176, showing a plurality of unchanged regions of the plurality of current blocking layers 175 and the plurality of oxidized mirror layers 176. As to the conductive/insulative regions, see column 5, lines 29-31, referring to Fig. 1B (interdiffused portion 32 of oxidizing layer 24 is substantially electrically conductive, while oxidized portion 28 is electrically resistive). See also column 6, lines 23-28, referring to Fig. 3 (oxidation barriers 18 and 18'); column 10, lines 59-63, with reference to Fig. 9.</p> |
| <p>second means for selectively exposing a portion of said second current blocking layer to said oxidizing agent to define a second nonoxidized region of said second current blocking layer surrounded by a second oxidized region of said second current blocking layer, said second nonoxidizing region of said second current blocking layer being aligned with said preselected region of said active region, said second oxidized region being electrically insulative, said second nonoxidized region being electrically conductive, said first and second nonoxidized regions being aligned with each other to define a current channel extending through said preselected region of said active region; and</p> | <p>Column 8, lines 54-48, referring to Fig. 6E (illustrating an ohmic etch/deposition step in which holes 168 are etched through regions defined by masks 170. As discussed in column 6, lines 14-19, etching is also involved to form a plurality of pits, 58 and 58', or more, may be formed which may be nominally identical or of different depths as illustrated by pit 58' in Fig. 2B. Fig. 6F illustrates not only the first means for selectively exposing a portion of said first and second current blocking layers (oxidized layers 28 of Figs. 5A-F and 24 of Fig. 6F) to a preselected agent to define a first unchanged region (nonoxidized layers 26 of Figs. 5A-F and 26 of Fig. 6F) of the plurality of current blocking layers, but also the second means by incorporating the etching of the plurality of pits 58 and</p> |

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| | <p>58', or more, as discussed above. Fig. 6F illustrates that a second etch is performed masked by photoresist 172, forming larger holes 174 which reaches through oxidizing layers 24 and nonoxidizing layers 26. Additionally, as discussed in column 9, lines 4-9, Fig. 6G illustrates the result of the oxidation step forming oxidized layers 175 and oxidized mirror layers 176, showing a plurality of unchanged regions of the plurality of current blocking layers 175 and the plurality of oxidized mirror layers 176. As to the conductive/insulative regions, see column 5, lines 29-31, referring to Fig. 1B (interdiffused portion 32 of oxidizing layer 24 is substantially electrically conductive, while oxidized portion 28 is electrically resistive). See also column 6, lines 23-28, referring to Fig. 3 (oxidation barriers 18 and 18'); column 10, lines 59-63, with reference to Fig. 9.</p> |
| <p>wherein said first means for selectively exposing and said second means for selectively exposing include at least one etched depression extending from said first surface of said laser structure into the body of said laser structure and through said first and second current blocking layers to expose a portion of said first and second current blocking layers to said preselected agent during manufacture of said laser structure.</p> | <p>Column 6, lines 5-22. See Fig. 2 (describing that pit 58 is typically formed by etching, where 58 typically extends at least into, or very near to, oxidizing layer 12). Oxidizing layer 12, according to Column 5, lines 52-55, and Fig 1D, is made up of a plurality of oxidizing layers. See also Column 6, line 14, referring to Fig. 2B (pit 58 is typically formed by etching). Further, column 6, lines 15-18, and Fig. 2B, teach that a plurality of pits 58 and 58', or more, may be formed which may be nominally identical or of different shapes and/or depths as illustrated by pit 58'. See also column 8, lines 54-58, Fig 6E (holes 168 are etched through masks 170); Column 8, line 66-67, Fig. 6F, for holes 174.</p> |
| Claim 70 | |
| <p>The laser structure of claim 69, wherein: said laser structure comprises a substrate portion, a lasing portion disposed on said substrate portion, a contact support portion disposed on said substrate portion, and a bridging portion disposed on said substrate portion, said</p> | <p>Substrate portion: Column 7, lines 15, 23, 31, <i>inter alia</i>, referring to Figs. 5A-F (illustrating substrate 82). See also Fig. 7 (substrate 182). Referring to Figs. A-F, lasing portion 86 is disposed on substrate portion 82. See also</p> |

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| bridging portion connected between said lasing portion and said contact support portion, said first and second current blocking layers being exposed at a surface of said lasing portion. | Column 9, line 21. See Fig. 6J displaying interconnect metal 100, where oxidation barrier (first current blocking layer 28) is exposed at the surface of the lasing portion 86. Interconnect metal 100 is comprised of the contact support portion 96 and the bridging portion 100 disposed on the substrate portion. And see column 5, lines 52-55, referring to Fig. 1D (illustrating conductive element 40 comprising a plurality of oxidizing layers 12, teaching that a plurality of layers are exposed at the surface of the lasing portion). |
| Claim 71 | |
| The laser structure of claim 70, wherein: said first and second current blocking layers comprise an aluminum bearing material. | Column 5, lines 18-23. See Fig. 1B (exemplary materials are AIAs for oxidizing layer 24). Additionally, see column 7, lines 4-14 which discuss the abundance of examples of the oxidizing materials primarily comprising Al as the group III element. |
| Claim 72 | |
| The laser structure of claim 70, wherein: said oxidizing agent is water vapor. | Column 9, line 8 (oxidation performed, for example, at 425°C in a water vapor rich atmosphere). |
| Claim 73 | |
| The laser structure of claim 69, wherein: said first and second means for selectively exposing further include four etched depressions extending from said first surface of said laser structure into the body of said laser structure and through said first and second current blocking layers to expose a plurality of portions of said current blocking layers to said preselected agent during manufacture of said laser structure. | Column 6, lines 5-22. See Fig. 2 (describing that pit 58 is typically formed by etching, where 58 typically extends at least into, or very near to, oxidizing layer 12). Oxidizing layer 12, according to Column 5, lines 52-55, and Fig 1D, is made up of a plurality of oxidizing layers. See also Column 6, line 14, referring to Fig. 2B (pit 58 is typically formed by etching). Further, column 6, lines 15-18, and Fig. 2B, teach that a plurality of pits 58 and 58', or more, may be formed which may be nominally identical or of different shapes and/or depths as illustrated by pit 58'. See also column 8, lines 54-58, Fig 6E (holes 168 are etched through masks 170); Column 8, line 66-67, Fig. 6F, for holes 174. |
| Claim 74 | |
| A laser structure, comprising: an active region; | Column 7, lines 16, 24, 32,33, 48, and 57. See Figs. 5A-F (86). |

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| a first electrical contact disposed on a first surface of said laser structure; | Column 7, lines 21, 29-30, 36, 44, 53, and 60. See Figs. 5A-F (96). |
| a second electrical contact, said active region being disposed between said first and second electrical contacts, said laser structure being a vertical cavity surface emitting laser; | Column 7, lines 22 and 30. See Figs. 5A-C, which illustrate active region 86 being disposed between top contact 96 and bottom contact 98. See also Column 7, lines 45, 53 and 60. See Figs. 5D-F (128). Figs. D-F illustrate active region 86 being disposed between top contact 96 and bottom contact 128. As to being a VSEL, see Column 6, lines 43. See Figs. 5A (80), 5B (102), 5C (110), 5D (116), 5E (130) and 5F (138). Fig. 6 illustrates an example of a processing method to produce VSELS. See also Column 9, line 123; Fig. 7 (180). |
| a first current blocking layer, said first current blocking layer being subject to oxidation when exposed to an oxidizing agent; | Column 6, lines 13-14, referring to Fig. 2B (illustrating oxidizing layer 12). See also Column 7, lines 28-34. See Figs. 5A-F (teaching oxidized portions 28). |
| a second current blocking layer, said second current blocking layer being subject to oxidation when exposed to said oxidizing agent; | Column 9, lines 4-9. See Fig. 6G (175). See also column 5, lines 52-55, Fig. 1D (a plurality of oxidizing layers 12). Figs. 5A-F illustrate a plurality of current blocking layers 28, each being oxidized portions of the current blocking layer being subject to oxidation when exposed to an oxidizing agent. |
| first means for selectively exposing a portion of said first current blocking layer to said oxidizing agent to define a first nonoxidized region of said first current blocking layer surrounded by a first oxidized region of said first current blocking layer, said first nonoxidized region of said first current blocking layer being aligned with a preselected region of said active region, said first oxidized region being electrically insulative, said first nonoxidized region being electrically conductive; | Column 8, lines 54-48, referring to Fig. 6E (illustrating an ohmic etch/deposition step in which holes 168 are etched through regions defined by masks 170. As discussed in column 6, lines 14-19, etching is also involved to form a plurality of pits, 58 and 58', or more, may be formed which may be nominally identical or of different depths as illustrated by pit 58' in Fig. 2B. Fig. 6F illustrates not only the first means for selectively exposing a portion of said first and second current blocking layers (oxidized layers 28 of Figs. 5A-F and 24 of Fig. 6F) to a preselected agent to define a first unchanged region (nonoxidized layers 26 of Figs. 5A-F and 26 of Fig. 6F) of the plurality of current blocking layers, but also the second means by incorporating the |

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| | <p>etching of the plurality of pits 58 and 58', or more, as discussed above. Fig. 6F illustrates that a second etch is performed masked by photoresist 172, forming larger holes 174 which reaches through oxidizing layers 24 and nonoxidizing layers 26. Additionally, as discussed in column 9, lines 4-9, Fig. 6G illustrates the result of the oxidation step forming oxidized layers 175 and oxidized mirror layers 176, showing a plurality of unchanged regions of the plurality of current blocking layers 175 and the plurality of oxidized mirror layers 176. As to the conductive/insulative regions, see column 5, lines 29-31, referring to Fig. 1B (interdiffused portion 32 of oxidizing layer 24 is substantially electrically conductive, while oxidized portion 28 is electrically resistive). See also column 6, lines 23-28, referring to Fig. 3 (oxidation barriers 18 and 18'); column 10, lines 59-63, with reference to Fig. 9.</p> |
| <p>second means for selectively exposing a portion of said second current blocking layer to said oxidizing agent to define a second nonoxidized region of said second current blocking layer surrounded by a second oxidized region of said second current blocking layer, said second nonoxidized region of said second current blocking layer being aligned with said preselected region of said active region, said second oxidized region being electrically insulative, said second nonoxidized region being electrically conductive, said first and second nonoxidized regions being aligned with each other to define a current channel extending through said preselected region of said active region; and</p> | <p>Column 8, lines 54-48, referring to Fig. 6E (illustrating an ohmic etch/deposition step in which holes 168 are etched through regions defined by masks 170. As discussed in column 6, lines 14-19, etching is also involved to form a plurality of pits, 58 and 58', or more, may be formed which may be nominally identical or of different depths as illustrated by pit 58' in Fig. 2B. Fig. 6F illustrates not only the first means for selectively exposing a portion of said first and second current blocking layers (oxidized layers 28 of Figs. 5A-F and 24 of Fig. 6F) to a preselected agent to define a first unchanged region (nonoxidized layers 26 of Figs. 5A-F and 26 of Fig. 6F) of the plurality of current blocking layers, but also the second means by incorporating the etching of the plurality of pits 58 and 58', or more, as discussed above. Fig. 6F illustrates that a second etch is performed masked by photoresist 172, forming larger holes 174 which reaches</p> |

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| | <p>through oxidizing layers 24 and nonoxidizing layers 26. Additionally, as discussed in column 9, lines 4-9, Fig. 6G illustrates the result of the oxidation step forming oxidized layers 175 and oxidized mirror layers 176, showing a plurality of unchanged regions of the plurality of current blocking layers 175 and the plurality of oxidized mirror layers 176. As to the conductive/insulative regions, see column 5, lines 29-31, referring to Fig. 1B (interdiffused portion 32 of oxidizing layer 24 is substantially electrically conductive, while oxidized portion 28 is electrically resistive). See also column 6, lines 23-28, referring to Fig. 3 (oxidation barriers 18 and 18'); column 10, lines 59-63, with reference to Fig. 9.</p> |
| <p>wherein said first and second means for selectively exposing further comprise at least one etched depression extending from said first surfaces of said laser structure into the body of said laser structure and through said first and second current blocking layers to expose a portion of said current blocking layers to said preselected agent during manufacture of said laser structure.</p> | <p>Column 6, lines 5-22. See Fig. 2 (describing that pit 58 is typically formed by etching, where 58 typically extends at least into, or very near to, oxidizing layer 12). Oxidizing layer 12, according to Column 5, lines 52-55, and Fig 1D, is made up of a plurality of oxidizing layers. See also Column 6, line 14, referring to Fig. 2B (pit 58 is typically formed by etching). Further, column 6, lines 15-18, and Fig. 2B, teach that a plurality of pits 58 and 58', or more, may be formed which may be nominally identical or of different shapes and/or depths as illustrated by pit 58'. See also column 8, lines 54-58, Fig 6E (holes 168 are etched through masks 170); Column 8, line 66-67, Fig. 6F, for holes 174.</p> |
| Claim 75 | |
| <p>The laser structure of claim 74, wherein: said laser structure comprises a substrate portion, a lasing portion disposed on said substrate portion, a contact support portion disposed on said substrate portion, and a bridging portion disposed on said substrate portion, said bridging portion connected between said lasing portion and said contact support portion, said first and second current blocking layers being exposed at a surface of said</p> | <p>Substrate portion: Column 7, lines 15, 23, 31, <i>inter alia</i>, referring to Figs. 5A-F (illustrating substrate 82). See also Fig. 7 (substrate 182). Referring to Figs. A-F, lasing portion 86 is disposed on substrate portion 82. See also Column 9, line 21. See Fig. 6J displaying interconnect metal 100, where oxidation barrier (first current blocking layer 28) is exposed at the</p> |

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| lasing portion, said first and second current blocking layers comprise an aluminum bearing material, said oxidizing agent being water vapor. | surface of the lasing portion 86. Interconnect metal 100 is comprised of the contact support portion 96 and the bridging portion 100 disposed on the substrate portion. And see column 5, lines 52-55, referring to Fig. 1D (illustrating conductive element 40 comprising a plurality of oxidizing layers 12, teaching that a plurality of layers are exposed at the surface of the lasing portion). Additionally, as to the aluminum bearing material attribute, see column 5, lines 13-23 (describing AlAs as an exemplary material for oxidizing layer 28 of Fig. 1B); see also column 7, lines 4-14 which discuss the abundance of examples of the oxidizing materials primarily comprising Al as the group III element. Finally, see column 9, line 8 (noting that oxidation can be performed, for example, at 425°C in a water vapor rich atmosphere). |
| Claim 76 | |
| The laser structure of claim 74, further comprising: a plurality of etched depressions extending from said first surface of said laser structure into the body of said laser structure and through said first current blocking layer to expose a plurality of portions of said current blocking layer to said oxidizing agent during manufacture of said laser structure. | Column 6, line 14. See Fig. 2B (pit 58 is typically formed by etching). Further, column 6, lines 15-18, and Fig. 2B, teach that a plurality of pits 58 and 58', or more, may be formed which may be nominally identical or of different shapes and/or depths as illustrated by pit 58'. See also column 8, lines 54-58, Fig. 6E (holes 168 are etched through masks 170); Column 8, line 66-67, Fig. 6F, for holes 174. |
| Claim 77 | |
| The laser structure of claim 74, wherein: the first and second means for exposing further include four etched depressions extending from said first surface of said laser structure into the body of said laser structure and through said first and second current blocking layers to expose a plurality of portions of said current blocking layers to said preselected agent during manufacture of said laser structure. | Column 6, line 14. See Fig. 2B (pit 58 is typically formed by etching). Further, column 6, lines 15-18, and Fig. 2B, teach that a plurality of pits 58 and 58', or more, may be formed which may be nominally identical or of different shapes and/or depths as illustrated by pit 58'. See also column 8, lines 54-58, Fig. 6E (holes 168 are etched through masks 170); Column 8, line 66-67, Fig. 6F, for holes 174. |